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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/730,623	12/08/2003	Antony P. Chacko	CTS-2411	4240
29184	7590	12/23/2005		
CTS CORPORATION 905 W. BLVD. N ELKHART, IN 46514			EXAMINER THOMAS, JAISON P	
			ART UNIT 1751	PAPER NUMBER
DATE MAILED: 12/23/2005				

Please find below and/or attached an Office communication concerning this application or proceeding.

<b>Office Action Summary</b>	<b>Application No.</b> 10/730,623	<b>Applicant(s)</b> CHACKO, ANTONY P.	
	<b>Examiner</b> Jaison P. Thomas	<b>Art Unit</b> 1751	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 08 December 2003.
- 2a) ☐ This action is **FINAL**.                      2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-35 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☒ Claim(s) 3, 8, 11-13, 15, 16 and 18 is/are allowed.
- 6) ☒ Claim(s) 1, 2, 4, 7, 9, 10, 14, 17 and 19-35 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 08 December 2005 is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All    b) ☐ Some    \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- |   |   |
|---|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)   | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)  | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152)             |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)<br>Paper No(s)/Mail Date <u>12/08/2003</u> . | 6) <input type="checkbox"/> Other: _____  |

## **DETAILED ACTION**

### ***Drawings***

The drawings are objected to because Figure 1 does not have a labeled y-axis. Corrected drawing sheets in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. Any amended replacement drawing sheet should include all of the figures appearing on the immediate prior version of the sheet, even if only one figure is being amended. The figure or figure number of an amended drawing should not be labeled as "amended." If a drawing figure is to be canceled, the appropriate figure must be removed from the replacement sheet, and where necessary, the remaining figures must be renumbered and appropriate changes made to the brief description of the several views of the drawings for consistency. Additional replacement sheets may be necessary to show the renumbering of the remaining figures. Each drawing sheet submitted after the filing date of an application must be labeled in the top margin as either "Replacement Sheet" or "New Sheet" pursuant to 37 CFR 1.121(d). If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

### ***Claim Rejections - 35 USC § 112***

The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Claim 17 recites the limitation "carbon nanoparticles" in Claim 17, line 1. There is insufficient antecedent basis for this limitation in the claim. For purposes of

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examination, "nanoparticles" is substituted for "carbon nanoparticles" as the limitation in Claim 17.

Claim 23 recites the limitation "nanoparticles" in Claim 23, line 1. There is insufficient antecedent basis for this limitation in the claim. For purposes of examination, "claim 2" is substituted for "claim 1" as the limitation in Claim 23.

Claim 5 recites limitations already present in Claim 1 and fails to further limit Claim 1.

***Claim Rejections - 35 USC § 102***

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims 25 and 26 are rejected under 35 U.S.C. 102(b) as being anticipated by Bosze (5,111,178).

Bosze teaches a method of preparing a conducting composition using the same steps as disclosed in Claims 25 and 26 (refer Column 6, lines 17-36 and Column 5, lines 63-65).

The reference is anticipatory.

***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

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(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 1, 4, 5, 6, 7, 14, 19, 20, 21, 22, 24, 28, 29, 30, 31, 33, 34, 35 are rejected under 35 U.S.C. 103(a) as being unpatentable over Bosze ('178).

Bosze ('178) teaches an electrically conductive composition which uses a resin, solvent, zirconia fibers, and conductive filler (refer Column 4, lines 6-60 and Column 5, lines 60-62). Bosze discloses a variety of resins that could be used, including "polyimides and diallylphthalates" (refer Column 4, line 5) and at weight percentages between 50 and 66% in uncured compositions (refer Columns 7-8). Bosze teaches of conductive filler that includes "graphite, and even metallic powders are suitable ... with carbon black being used in the preferred embodiment" (refer Column 4, lines 16-19) and at weight percentages of between 14.3 and 18.6% in uncured compositions (refer Columns 7-8). Furthermore, Bosze teaches the application of a cured conductive composition to a substrate (refer Column 3, line 42) and Bosze also teaches a method of preparing the conductive composition for use on a substrate (refer Column 6, lines 17-36). Bosze further teaches the use of surfactants and "coating additives" as components of the composition (refer Column 5, lines 63-65 and Column 6, lines 4-16). The components disclosed in Bosze are further mixed using both "blade agitation" and "roller mill" methods (refer Column 6, lines 26-36). In addition, Bosze teaches a cured film with compositions discussed above (refer Column 8, line 46). Bosze also teaches the use of carbon or zirconia fibers in the composition, with sizes of the fibers ranging from "0.5 micron to 20 microns in diameter, with approximately 3 to 12 microns in

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diameter being preferred" (refer Column 5, lines 9-12) and at weight percentages ranging from 0.47 to 2% in uncured compositions (refer Columns 7-8). Bosze further discloses "tests have been performed on potentiometers incorporating the novel cured electrically conductive film of the present invention" (refer Column 6, lines 37-39). Finally, Bosze teaches the use of epoxy resins "such as epichlorohydrin and bisphenol resin" (refer Column 5, lines 66-67) as additives to the conductive composition disclosed in the reference.

Bosze does not specifically recite the percentages of solvents or resins disclosed in Claim 1. Bosze does not specifically recite the specific weight percentages of the thermoset resins required by Claim 6. Bosze does not specifically recite application of the conductive composition to any of the substrates disclosed in Claim 19 nor does it teach of the solvents discussed in Claim 20. Bosze does not specifically recite the method of using of ball milling to mix the polymer solution disclosed in Claim 29. Further, Bosze does not disclose the method of monitoring the viscosity and controlling the viscosity based on monitored measurements required by Claim 30. Finally, Bosze does not specifically recite a method wherein the conductive composition is added to a substrate at a thickness of 40 microns. Note that the compositions/methods disclosed in the references are drawn to thick film coatings as are the instant claims.

However, the examiner respectfully submits that all above limitations would be obvious to one of ordinary skill in the art upon routine experimentation with the composition disclosed in Bosze. "[W]here the general conditions of a claim are disclosed in the prior art, it is not inventive to discover the optimum or workable ranges

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by routine experimentation." In re Aller, 220 F.2d 454, 456, 105 USPQ 233, 235 (CCPA 1955).

Claims 2, 9, 10, 23, 27, 32 are rejected under 35 U.S.C. 103(a) as being unpatentable over Bosze as applied to claims 2, 9, 10, 23, 27, 32 above, and further in view of Batliwalla et al. (4,722,853).

Bosze is relied upon for the reasons set forth above.

Bosze differs from the instant claims in failing to teach the addition of nanoparticles or silica nanoparticles as required by the instant claims.

Batliwalla ('853) discloses the use of "Cab-O-Sil M5" (refer Column 8, table), which is known in the art to contain nanosized particles of fumed silica, added to an electrically conductive composition for purposes of creating a polymer thick film ink. Batliwalla further teaches the addition of this fumed silica to the electrically conductive solution when preparing the final conducting composition (Column 9, lines 36-41).

It would have obvious to one of ordinary skill in the art to modify Bosze in view of Batliwalla to create a zirconia particle containing conducting composition that includes the silica nanopowder disclosed in Batliwalla in order to tailor properties of the conducting composition for use in various applications. It would have been further obvious to one of ordinary skill in the art that the Cab-O-Sil disclosed in Batliwalla would have nanosized silica particles, including silica particles on the size range of less than 100 nm and that these nanosized silica particles would have to be mixed into the Batliwalla/Bosze composition via the methods disclosed in Bosze (discussed above). Similarly, the use of various weight percentages of silica particles in the paste or cured

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film to achieve different material properties would be obvious to one of ordinary skill in the art in order to tailor properties. Thus all limitations of Claims 2, 9, 10, 23, 27, and 32 have been met.

***Allowable Subject Matter***

Claims 3, 8, 11, 12, 13, 15, 16, 17, 18 are allowable over prior art of record.

The prior art relied upon above does not disclose or fairly suggest the addition fluoropolymers, carbon nanoparticles, or clays to the electrically conductive compositions disclosed in the prior art.

Molnar et al. (6,533,955) teaches an electrically conductive composition that uses fluoropolymers in order to improve thermal stability. This composition, however, is melt-processed and not solvent based as required by Claim 3. Similarly, Blok (6,359,544) teaches the addition of kaolin clay to a conductive polymeric composition that is melt-processed and not solvent based as required by Claims 11, 12, and 13. Accordingly it would not have been obvious to one of ordinary skill in the art to combine these prior art references with those relied upon above in order to arrive to the claimed compositions in Claims 3, 11, 12, and 13. Claims 17 and 18 are allowed even though the prior art teaches all the limitations of Claim 2, it does not include the limitation of adding carbon fibers, nanofibers or nanotubes to the Claim 2 composition as required by Claims 8, 17 and 18.



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**Conclusion**

Other references made of record but not relied upon include Takahashi et al. (5,071,593) and Dorfman (5,470,643) both disclosing compositions very similar to those of the claims except for the presence of zirconia particles.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Jaison P. Thomas whose telephone number is (571) 272-8917. The examiner can normally be reached on Mon-Fri 8:30 am to 5:00 pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Yogendra Gupta can be reached on (571) 272-1316. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).



Jaison P Thomas  
Examiner  
Art Unit 1751



Mark Kopec  
Primary Examiner

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